

### REMARKS

Claims 1, 18, 19, and 23 are amended in the present response. Claim 22 has been cancelled. Claims 24-26 have been added. The support for the amendment to claims 1, 18, 19 and 23 are found in the specification as filed on page 17, line 13 (bubbling step), in Fig. 1 (transmission level), on page 10, Table 1 and Claims 18-19 as originally filed.

Rejection under 35 U.S.C. §102

The examiner has rejected Claims 18-21 under 35 U.S.C. §102(e) as being anticipated by Dejneka et al (US 6,589,895). Applicants believe the amendments to Claims 18-21 overcome this rejection.

The presently claimed glass has a transmission level of at least 80% over the wavelength range from about 0.5 micrometers to about 5 micrometers. As provided in the Declaration of Dr. Shyam Bayya, previously submitted, all the glasses disclosed by Dejneka contain thulium compound. Even small quantities of thulium, such as the 0.001 mole % of  $Tm_2O_3$  disclosed by Dejneka, will have a strong absorption in the 0.3-2.0 micron wavelength range. One skilled in the art would understand that the strong absorption of the glasses of Dejneka in that wavelength range would make the glasses of Dejneka incapable of transmission level of the presently claimed glass.

The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. In re Herz, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). As discussed above, the addition of thulium to the presently claimed glass, as in the Dejneka reference, would materially change the characteristics of the glass by significantly decreasing the transmission level over the recited range.

The examiner has stated that the "specification does contemplate the inclusion of unrecited components on page 16, lines 5-10. For this reason, the claims are assumed to be open to the inclusion of other ingredients, such as  $Tm_2O_3$ , even in major amounts." Applicants respectfully

disagree with examiner. The recited materials that the examiner refers to are nucleating agents (seed material) used only when preparing the glass-ceramic, as claimed in dependent claim 13. The specification discusses the amount of seed material that may be added to the glass melt in order to form a glass-ceramic. Page 16, lines 13-14 provides that the “addition of a large amount of seed material beyond the saturation limit of a glass melt will destabilize BGG glass and should be avoided.” Thus the materials recited by the examiner are part of the nucleation and crystallization process recited in Claim 13. The transmission properties recited in Claim 1 have not been changed, and the addition of thulium would change those optical properties, as discussed in the Declaration of Shyam Bayya.

Further, the examiner has stated that the Dejneka reference discloses that the halogen compounds strip out the OH groups during melting, therefore the recitation regarding hydroxyl group concentration is assumed to be inherent in the reference. This is directly contradicted by the declaration of Shyam Bayya, in paragraph 7, and Fig. 2. As Fig. 2 shows, the bubbling of the glass melt removes more hydroxyl ions in conjunction with the halogen component, than just the halogen component alone. Since Dejneka does not teach or disclose a bubbling step, the hydroxyl ion level in the glass of Dejneka is higher than the glass of the present claims, as shown in Fig. 2. The absorption of the glass disclosed in Dejneka would not have the transmission levels over the wavelength range of the presently claimed glass. The examiner has maintained that Dejneka inherently possesses less than 1 ppm OH. Applicants respectfully direct the examiner's attention to Fig. 4 of Dejneka, wherein “0.001  $\beta$ -OH” appears to be the lowest OH level disclosed by Dejneka. As 1 ppm = 0.000001, it would appear that Dejneka has a much higher level of hydroxyl ions than the 1 ppm limit of the claims.

Applicants respectfully submit that Dejneka does not teach or disclose the glass of the presently claimed invention and that the examiner's rejection has been overcome.

Rejection under 35 U.S.C. §103(a)

The examiner has rejected Claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Dejneka in view of Jewell. Applicants believe the amendments to Claim 1 overcome the examiner's rejection.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: 1. Determining the scope and contents of the prior art. 2. Ascertaining the differences between the prior art and the claims at issue. 3. Resolving the level of ordinary skill in the pertinent art. 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

"In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). A statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

As discussed above, Dejneka does not teach or disclose the presently claimed glass having a transmission level of at least 80% over the wavelength range from about 0.5 micrometers to about 5 micrometers. Further, neither Jewell nor Dejneka teaches or discloses bubbling the glass during the melting step in order to reduce hydroxyl ions and thus increase the transmission level of the resulting glass to the claimed level over the wavelength range. Thus, forming the glass of Dejneka using the methods of Jewell does not result in the presently claimed glass. As discussed above, the glass of Dejneka does not have the optical properties of the present glass. One skilled in the art would understand that the method of Jewell would not impart those missing properties to the glass

of Dejneka. As demonstrated in paragraph 7, and Fig. 2 of the Declaration of Shyam Bayya, previously submitted, the bubbling of the glass melt removes more hydroxyl ions alone than the addition of the halogen component alone does. When bubbling is done in conjunction with the addition of a halogen component, the removal of hydroxyl ions is even greater. Since Dejneka does not teach or disclose a bubbling step, the hydroxyl ion level in the glass of Dejneka is inherently higher than the glass of the present claims. The absorption of the glass disclosed in Dejneka would not have the transmission levels over the wavelength range of the presently claimed glass. Applicants respectfully submit that the examiner's rejection has been overcome and request reconsideration.

Claims 2-17, 22 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dejneka in view of Jewell in further view of Higby, et al. The examiner states that Dejneka and Jewell are silent on the treatment of fining, however Higby discloses that a vacuum may be applied to BGG glass at its melting temperature to remove dissolved gases.

Claim 22 has been cancelled by the present amendment. Claims 2-17 and 23 depend, either directly or indirectly, from Claim 1. Claim 1 is allowable for the reasons discussed above, therefore Claims 2-17 and 23 are also allowable. Applicants respectfully request reconsideration and allowance of these claims.

The examiner provided no specific recitation of bubbling for the rejection of the bubbling step previously presented in Claim 22. Applicants are concerned that the examiner believes this bubbling step is equivalent to the fining step, where bubbles are allowed to escape from the glass melt. The "bubbling step" of former Claim 22 and current Claim 1 is a step where bubbles are *introduced* to the glass melt *during* the melting period rather than when bubbles are *removed* from the glass melt during the quiescent period where gas bubbles are allowed to escape after the bubbling step. The bubbling step, which is followed by removal of the bubbling tube, then followed by the fining step, is disclosed on page 17, lines 11 - 13. Further, note on page 12, lines 19-22, the fining step is discussed in terms of "removing mixing implements and the bubbling tube and allowing the molten glass composition to remain quiescent for about a few hours during which time,

bubbles in the glass composition are allowed to escape". Thus, the bubbling tube, used for bubbling the glass with dry gas during the melting step, must be removed before the fining step of the dependent claims occurs.

In conclusion, Applicants respectfully submit that the Examiner's Office Action has been fully responded to and that the claims are in condition for allowance. In the furtherance of compact prosecution, if a personal or telephone interview would help expedite matters, the Examiner is requested to contact Amy Ressing at 202-404-1558. Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Please charge the fees due for this action to Deposit Account 50-0281. Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 50-0281.

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Respectfully submitted,

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